

ENGINE (GE13)

EN

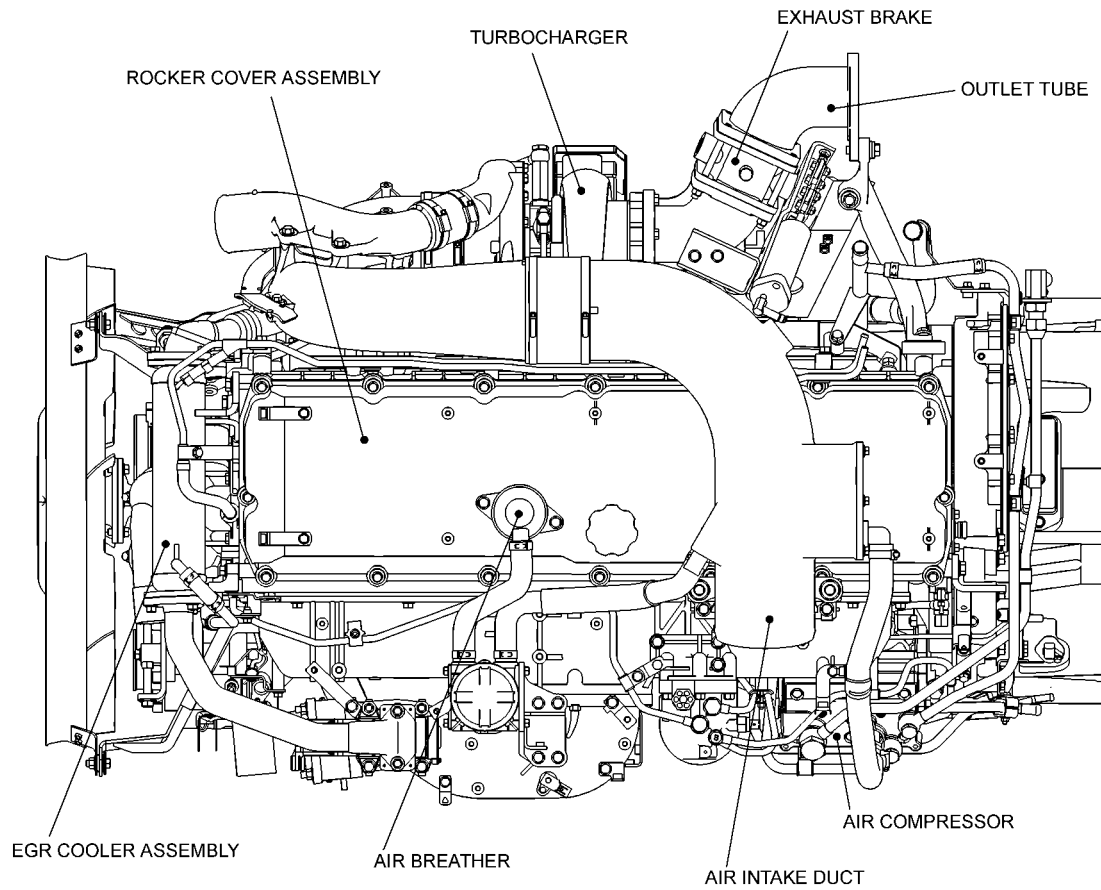
**EM-ENGINE MECHANICAL
LB-LUBRICATION SYSTEM
CO-COOLING SYSTEM
EF-FUEL SYSTEM
IE-AIR INTAKE AND EXHAUST SYSTEM
EA-AUXILIARY EQUIPMENT
EC-ENGINE CONTROL SYSTEM
EMC-EMISSION CONTROL SYSTEM**

CONSTRUCTION OF ENGINE ASSEMBLY

MAJOR COMPONENTS

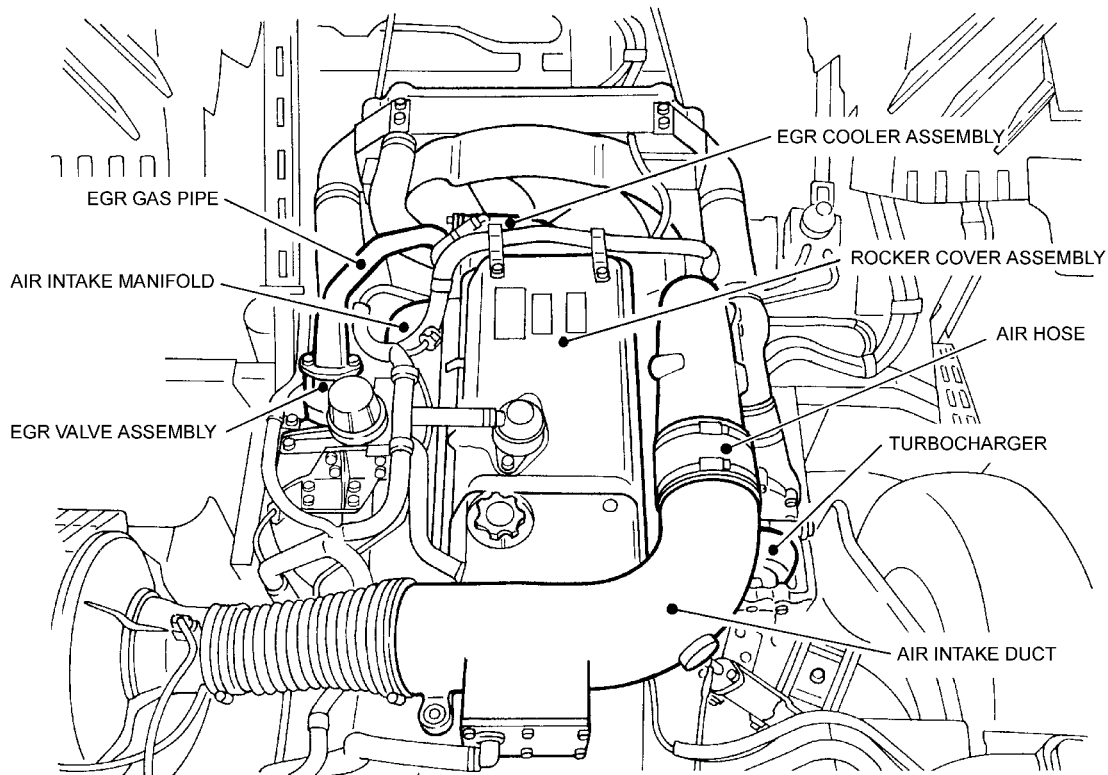
ENGINE TOP SIDE

GE13TB (279kW {380PS}) with SCR, GE13TB (286kW {390PS}) with SCR, GE13TC (302kW {410PS}) with SCR



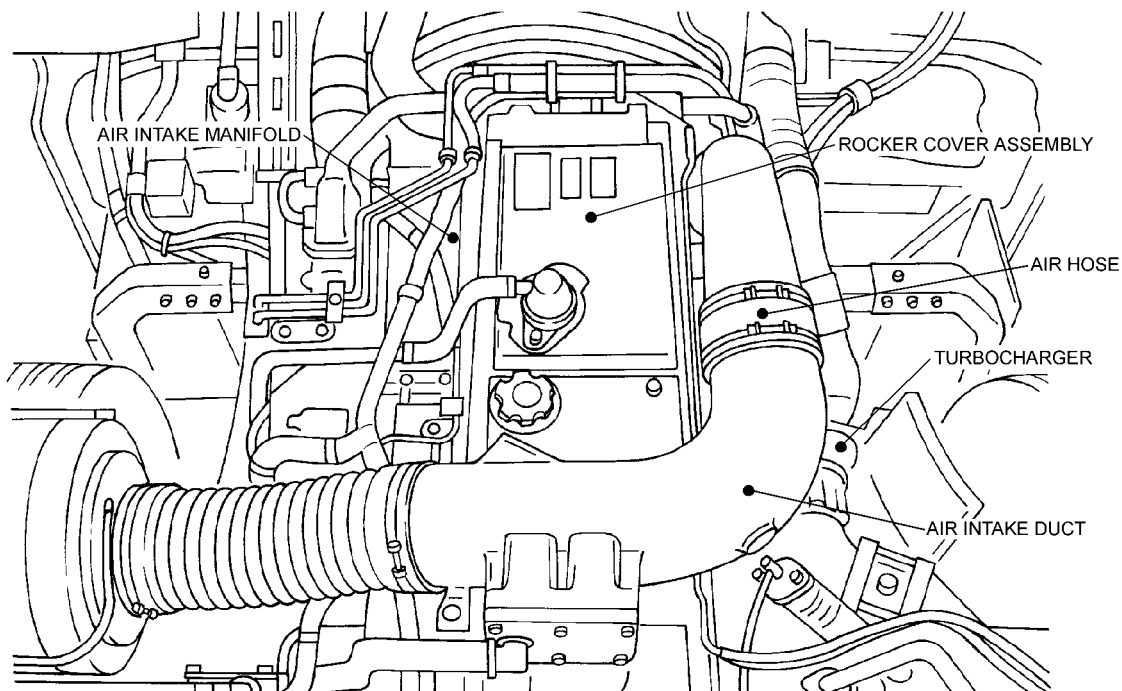
WEM071A

GE13TB, GE13TC, GE13TD



WEM016A

GEB3, GED3

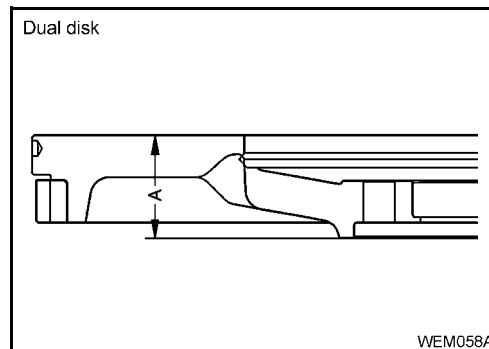
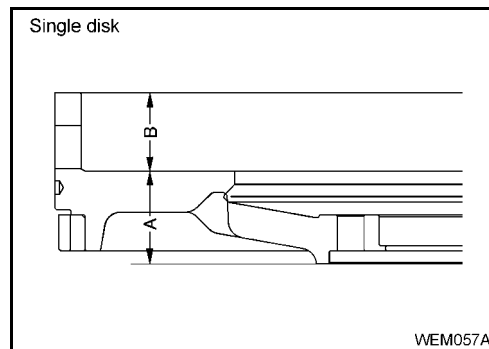


WEM070A

Remaining thickness of friction surface

Unit: mm

Item		Maintenance standard	Service limit
Remaining thickness (A) of clutch disc contacting surface	Single disc	56.8	54.8
	Dual disc	53.8	51.8
Depth (B) from flange end face	Single disc	47.90 - 48.10	-



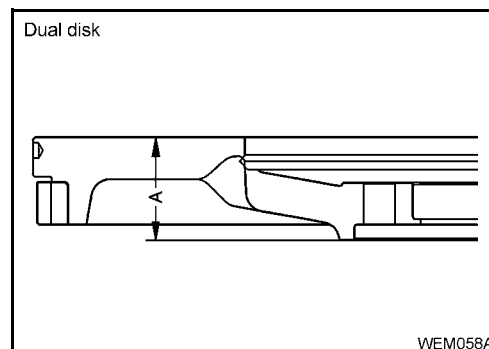
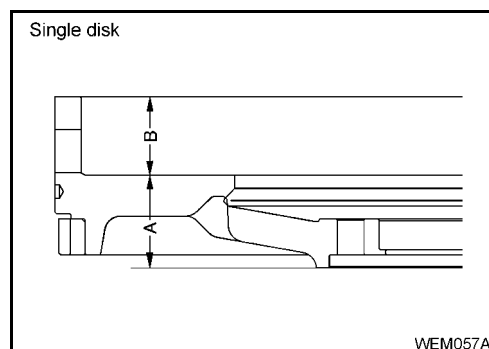
REPAIR AND REPLACEMENT

Correction of flywheel

Grind or cut flywheel so that runout of clutch disc contacting surface meets the maintenance standard. However, if clutch disc contacting surface is worn down beyond service limit, replace flywheel.

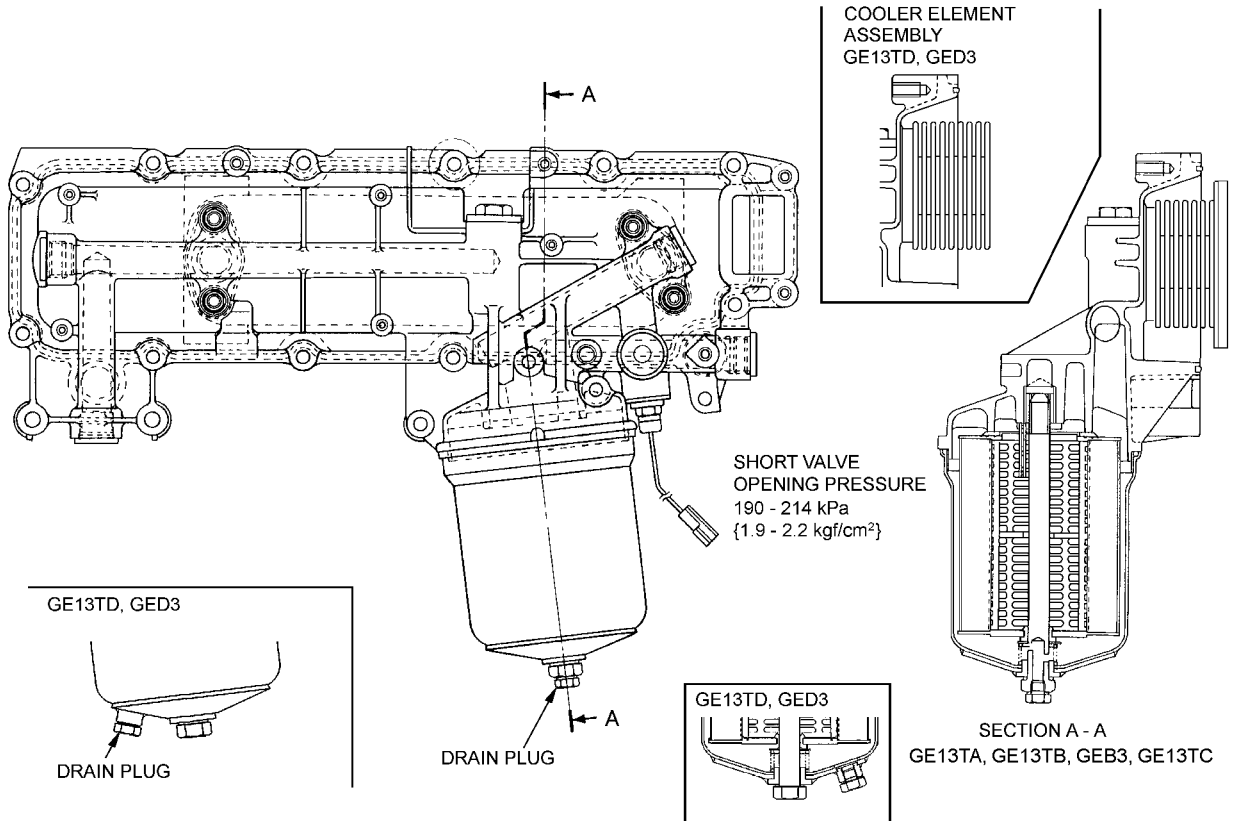
Unit: mm

Item		Maintenance standard	Service limit
Remaining thickness (A) of clutch disc contacting surface	Single disc	56.8	54.8
	Dual disc	53.8	51.8
Depth (B) from flange end face	Single disc	47.90 - 48.10	-
Runout of clutch disc surface		0.12 or less	0.15



OIL COOLER

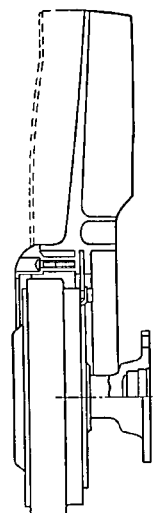
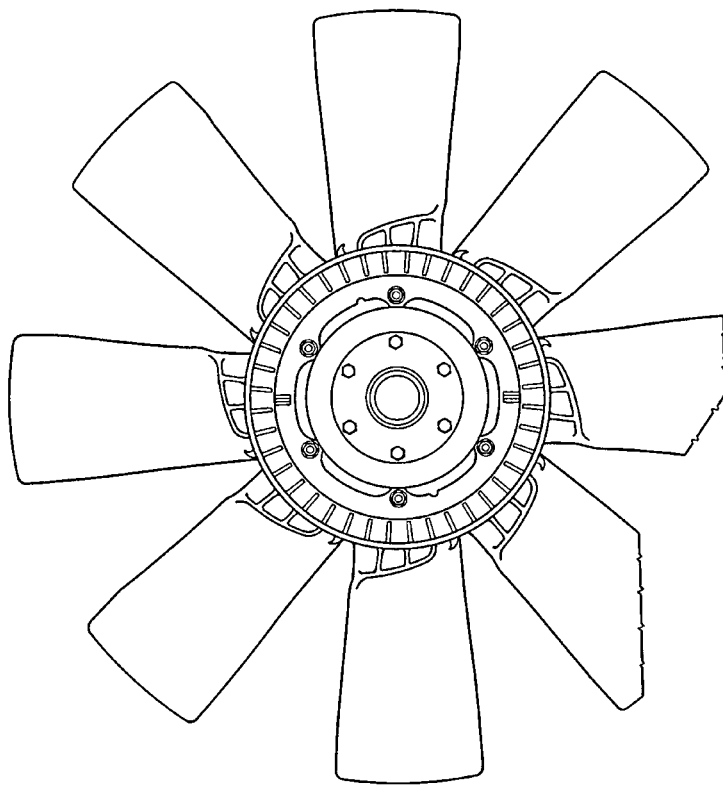
CONSTRUCTION



WLB216A

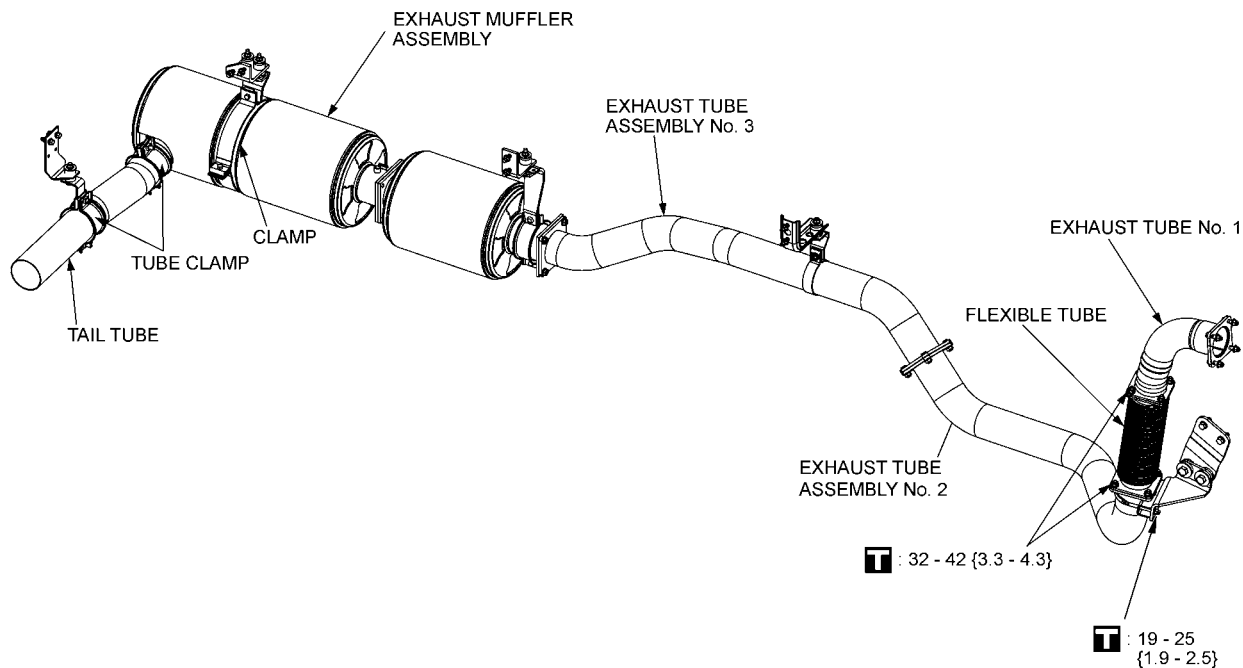
FAN CLUTCH

CONSTRUCTION



WC0006A

CGB SERIES (R.H.D MODEL)



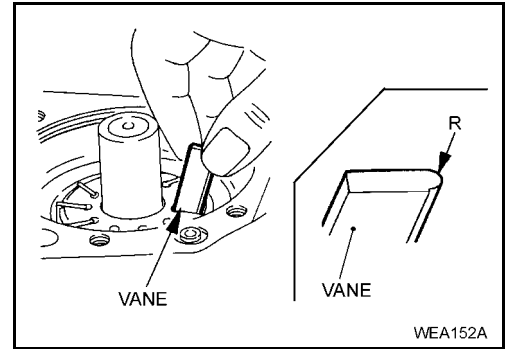
T : N·m {kgf·m}

WMA308A

11. Install vane.

NOTE

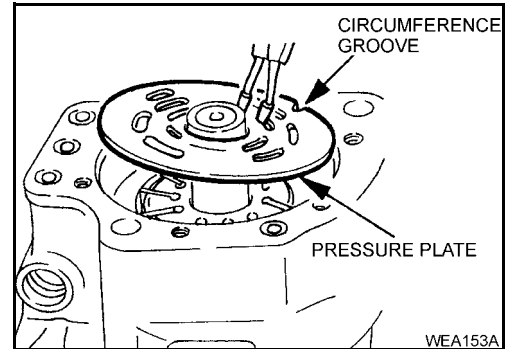
- The R side of vane should face the ring side (outside).



12. For the installation, align the circumference groove of pressure plate with straight pin.

NOTE

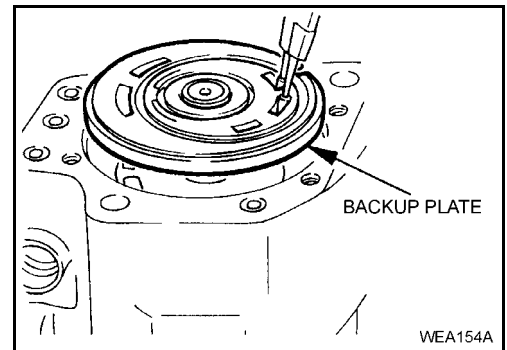
- The gold-colored surface of pressure plate should face toward the rotor side.



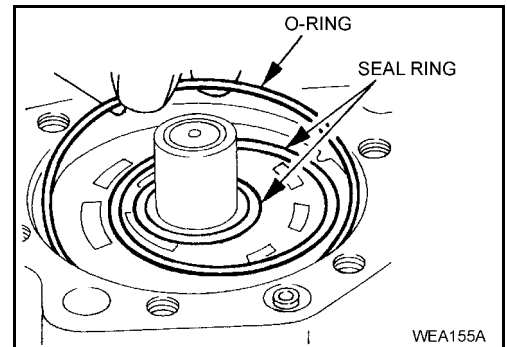
13. For the installation, align the circumference groove of backup plate with straight pin.

NOTE

- Seal ring mounting groove side should face toward outside (upward).

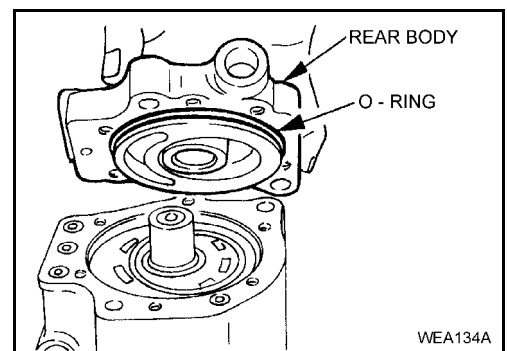


14. Install the seal rings (2) and O-ring.



15. Install the rear body in which O-ring has been installed.

Tightening torque [N•m {kgf•m}]: 17.7 - 24.5 {1.8 - 2.5}

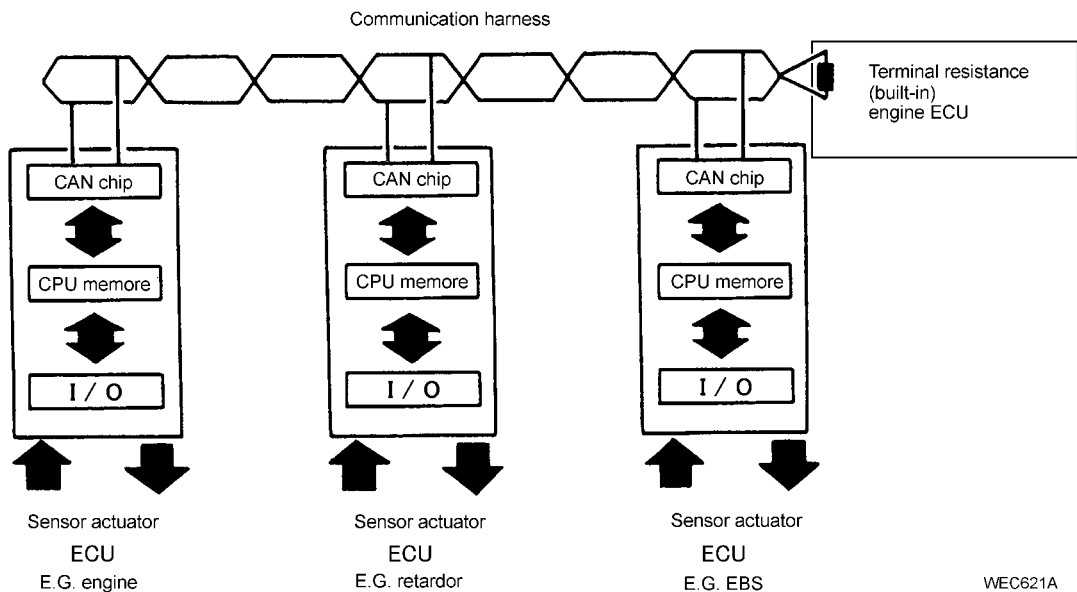


In appearance, two twisted communication harnesses are used.
The terminal resistance is built into the controller.

<Terminal resistance of engine CAN communication circuit>

- Type I : Engine ECU and AdBlue quality sensor
- Type II : Engine ECU and harness
- Type IV, V : Engine ECU and AdBlue level and quality sensor

Each ECU has the communication CAN chip common for the CAN communication system and it is connected to two communication harnesses.



WEC621A

The ECU connected to the CAN communication line is the engine, retarder, EBS, ABS + ASR, EHS and multi-display unit.

An error on the network varies depending on the system. It can be diagnosed with the number failure code with the signal from ECU (Displayed by multi-display monitor and PC failure diagnosis tool) or with the failure of the warning light ON/OFF pattern.

8. Check connection status of connectors

Check if there is loosening or damage of the connectors between the accelerator sensor and the engine ECU, or loosening of the terminal.

⚠ CAUTION
● There shall be no entry of water or oil.

Evaluation

OK → Go to 9.

NG → Faulty connector. (Apply a connector cleaning spray and cleaning by air. Connect it again to check for the connector condition.)

9. Check harness between the engine ECU and sensor

1. Turn OFF the ignition switch.
2. Disconnect the connector of the accelerator sensor (MR-130).
3. Disconnect the engine ECU connector, and connect the signal check harness (99731 Z000D) only to connector of engine harness side. Keep the connector of the engine ECU disconnected.
4. Check for open circuit and short circuit of the harness between terminals below.

Contact box	Connector at accelerator sensor harness
E33 (SIG1)	1 (8216•G/B)
E29 (SIG2)	4 (8213•Y/L)
E37 (GND)	3 (8296•B)

Evaluation

OK → Faulty sensor.

NG → Open or short in harness.

10. Check connection status of connectors

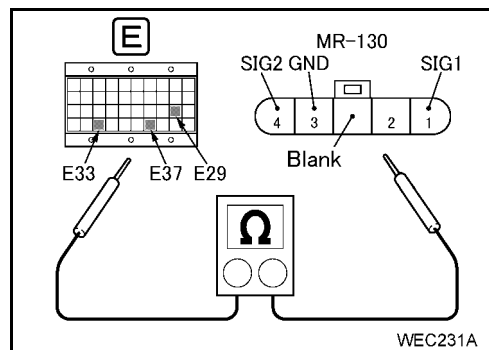
Check if there is loosening or damage of the connectors between the accelerator sensor and the engine ECU, or loosening of the terminal.

⚠ CAUTION
● There shall be no entry of water or oil.

Evaluation

OK → Go to 11.

NG → Faulty connector. (Apply a connector cleaning spray and cleaning by air. Connect it again to check for the connector condition.)



6. Check sensor unit

1. Turn OFF the ignition switch.
2. Disconnect connectors of the crank angle sensor unit and the camshaft position sensor unit.
3. Measure the resistance at the crank angle sensor unit connector (E-35) and the camshaft position sensor unit connector (E-37) between SIG and GND.

Crank angle sensor unit connector	Connector at crank angle sensor unit
1 (8284•W)	2 (8283•B)

Camshaft position sensor unit connector	Connector at camshaft position sensor unit
1 (8280•OR/L)	2 (8281•W/L)

Resistance between terminals [Ω]: 639 - 781 (Reference value at normal temperature)

Evaluation

OK → Go to 7.

NG → Faulty sensor.

7. Check connection status of connectors

Check if there is loosening or damage of the harness connectors, or loosening or corrosion of the terminals.

⚠ CAUTION
<ul style="list-style-type: none"> ● There shall be no entry of water or oil.

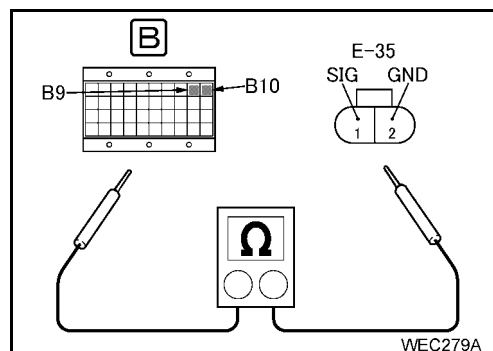
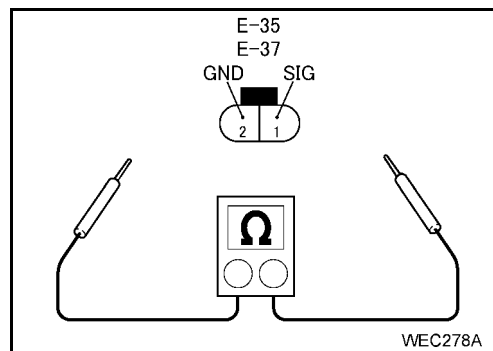
Evaluation

OK → Go to 8.

NG → Faulty connector. (If the connector is dirty, apply a connector cleaning spray. Clean it by air and connect it again to check for the connector condition.)

8. Check harness between the engine ECU and sensor

1. Turn OFF the ignition switch.
2. Disconnect the connector of the crank angle sensor (E-35) or the camshaft position sensor (E-37).
3. Disconnect the engine ECU connector, and connect the signal check harness (99731 Z000D) only to connector of engine harness side. Keep the connector of the engine ECU disconnected.
4. Check the harness between terminals for open circuit or short circuit.
5. Check for open circuit and short circuit of the harness between terminals below.



WORKING METHOD

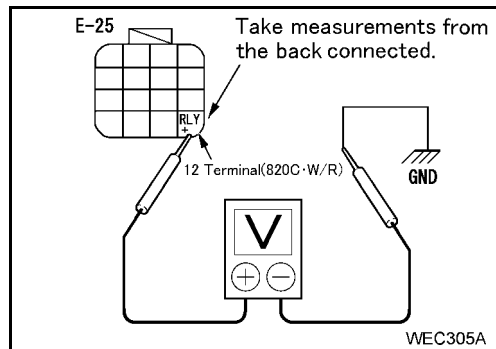
[Inspection]

1. Check EDU relay power voltage

1. Turn ON the ignition switch with the engine stopped.
2. Measure the voltage from the back of terminal 12 (820C•W/R) of the EGR EDU connector (E-25) and check if the battery voltage is applied.

Evaluation

OK → Type I, IV, V → Go to 2. Type II → Go to 4.
 NG → Go to 3.



2. Check CAN bus (Type I, IV, V)

1. Check the failure code, using the failure diagnosis tool or the diagnose switch.
2. Check if the message reception large interval error (Failure codes D155 and D159) of the urea dosing system and the AdBlue quality sensor (*1) system is found in the output error code. Also check if error is detected at the post-treatment system.

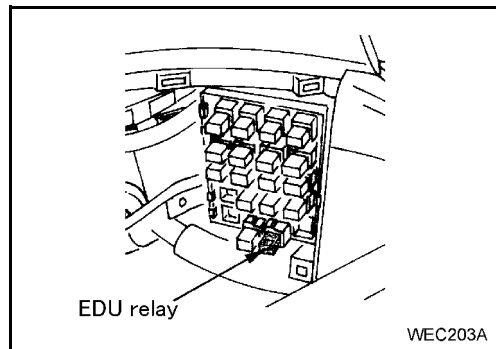
*1 In case of type IV, V : AdBlue level and quality sensor

Evaluation

NOT OCCUR → Go to 4.
 OCCUR → CAN bus error. Refer to “Actions for engine CAN wiring error C001, Failure items and actions”.

3. Check EDU relay unit

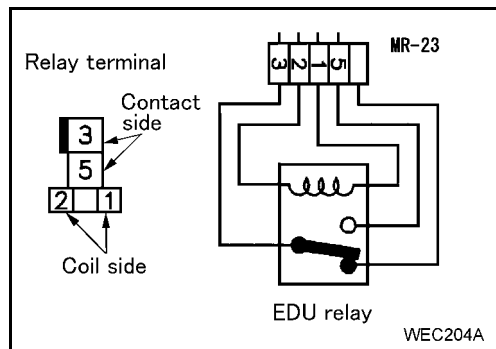
1. Turn OFF the ignition switch.
2. Remove the EDU relay from the relay box.



3. Apply 24V between coil terminals 1 and 2, and check if there is continuity between contact terminals 3 and 5.
4. Check if contact terminals 3 and 5 are insulated without applying voltage to the coil terminals.

Evaluation

OK → Go to 5.
 NG → Faulty EDU relay, replace it.

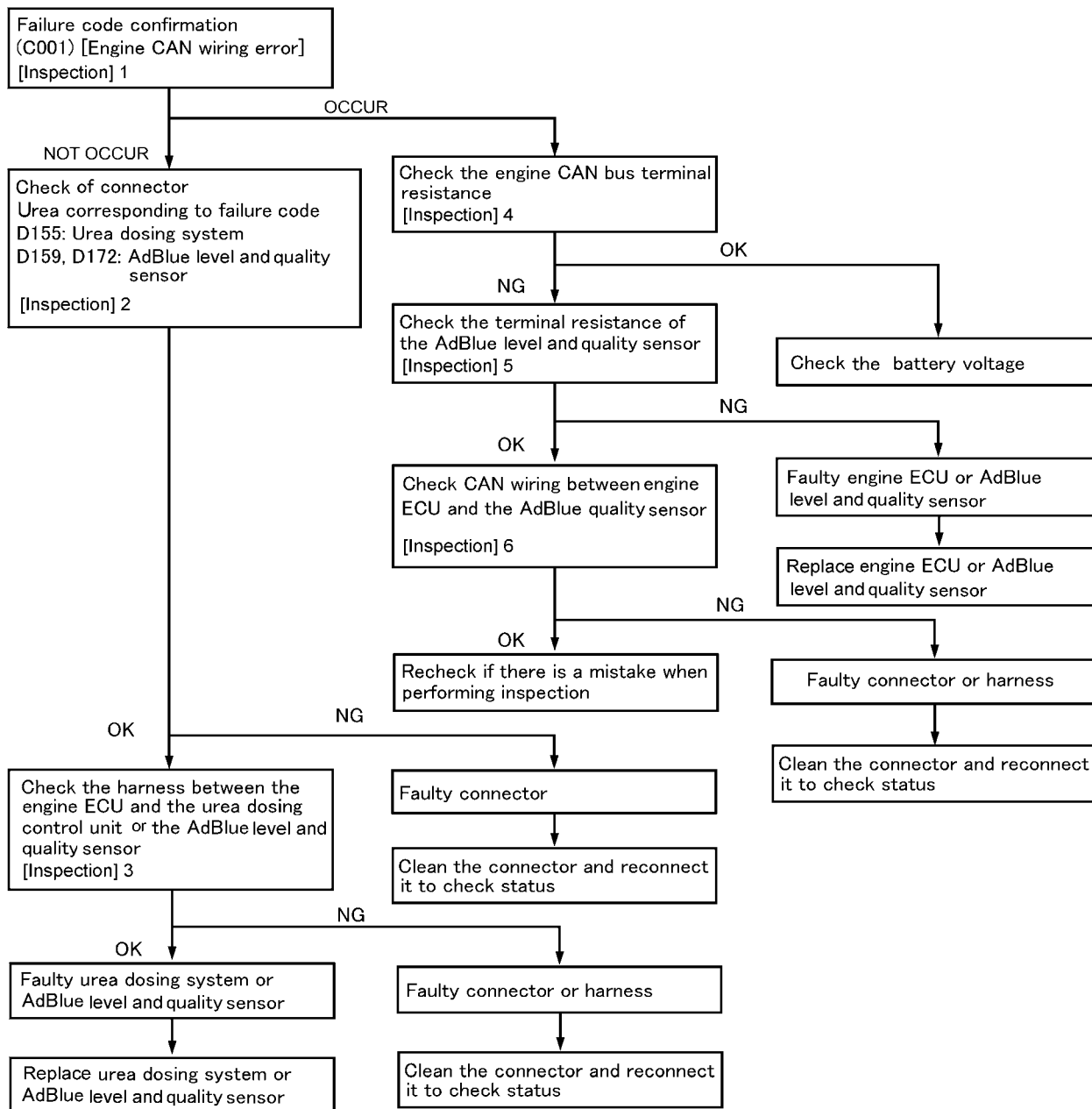


ACTIONS FOR UREA DOSING SYSTEM AND ADBLUE QUALITY SENSOR COMMUNICATION ERROR [D155, D159, D172] (TYPE IV, V)

FACTORS

CAN bus (Terminal resistance), CAN wiring, urea dosing control or AdBlue level and quality sensor

PROCEDURE



- If failure is corrected by replacing the engine ECU, mount the removed ECU again and make sure that the failure is recurrent.
- After inspection, return the connector and harness to the original position. Make sure that the check engine light is OFF after the ignition switch is OFF and ON, and that error is not detected.

WEQ666A

WORKING METHOD

[Inspection]

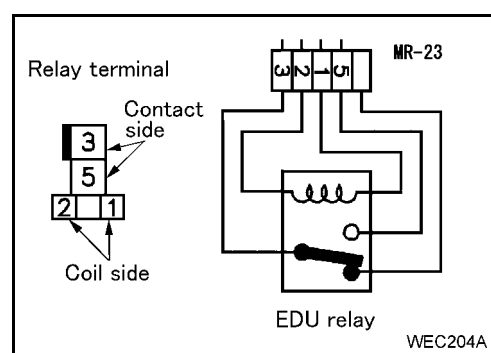
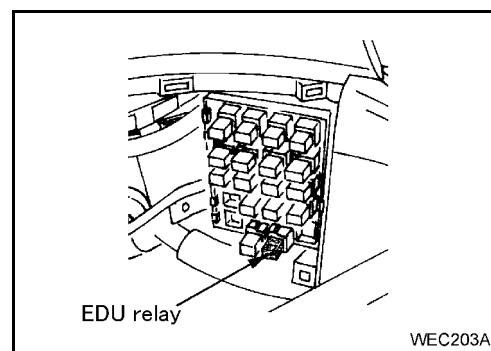
1. Check relay unit

1. Turn OFF the ignition switch.
2. Remove the EDU relay from the relay box.
3. Apply 24V between coil terminals 1 and 2, and check if there is continuity between contact terminals 3 and 5.
4. Check if contact terminals 3 and 5 are insulated without applying voltage to the coil terminals.

Evaluation

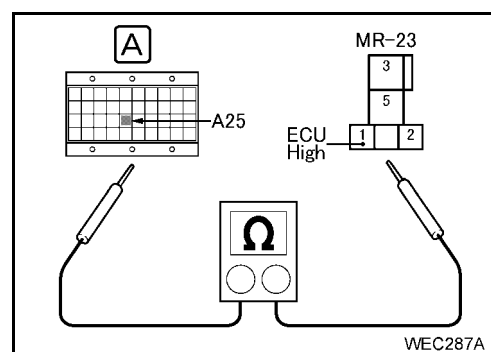
OK → Go to 2.

NG → Faulty EDU relay, replace it.



2. Check connector and harness between the engine ECU and the relay

1. Turn OFF the ignition switch.
2. Disconnect the engine ECU connector and connect the signal check harness (99731 Z000D) only to connector of engine harness side. Keep the connector of the engine ECU disconnected.
3. Disconnect the EDU relay connector (MR-23).
4. Check for open circuit and short circuit of the harness between terminals below.



Contact box	Connector at EDU relay harness
A25	1 (820A•R)

NOTE

- If no error is found in the inspection above, harness or connector between the EDU relay (connector MR-23, Terminal No: 2 (820B•B)) and GND (MR-131 (0096•B)) may be faulty.

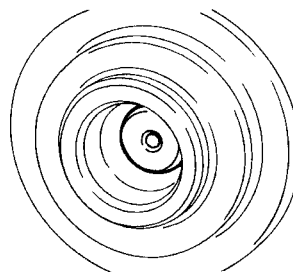
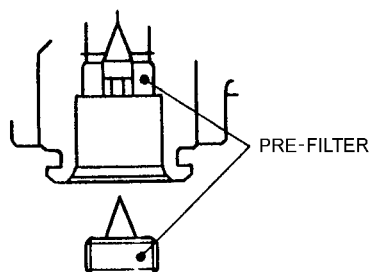
Evaluation

OK → Faulty engine ECU, replace it.

NG → Faulty harness or connector. If the connector is dirty, apply a connector cleaning spray. Clean it by air and connect it again to check for the connector condition.

Key point of installation

1. Using the tool (99755 00Z0B), install a new pre-filter.
Tightening torque [N·m {kgf·m}]: 0.3 - 0.5 {0.03 - 0.05}
2. Install the AdBlue tube together with the connector to the AdBlue (IN).



The pre filter has been inserted

WEMC072A

AdBlue tank

Key point of removal

Type I

1. Remove the coolant tube, harness connector, and AdBlue tube.

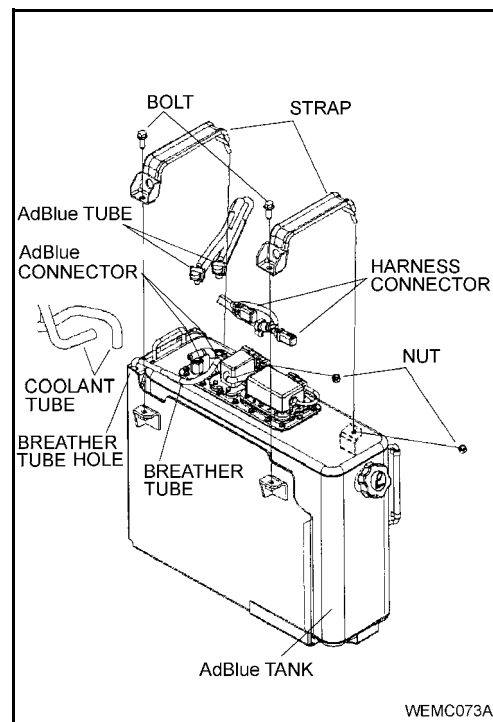
NOTE

- First, remove the coolant tube to prevent the coolant remaining in the tube from entering the tank through its AdBlue connector.
- The harness connector should be removed last to prevent AdBlue remaining in the hose from splashing onto the harness connector terminal. If AdBlue adheres to the harness connector terminal, the terminal corrosion may be caused.

2. Remove the strap and remove the AdBlue tank from the vehicle.

NOTE

- When removing the AdBlue tank, keep the breather tube attached to the tank to prevent the breather from being clogged.



WEMC073A